

SOME CHARACTERISTICS OF TORNADES.

By ALFRED WEGENER.¹[Abstracted from *Meteorologische Zeitschrift*, Sept.-Oct., 1918, pp. 245-249.]

For the benefit of those interested in tornadoes, the author has outlined some of the chief characteristics of European tornadoes, pointing out those points concerning which there is much to be learned. It appears that with relation to the frequency of thunderstorms, tornadoes are less frequent in the evening in spring than in the morning in autumn. They seem to be most frequent in the lee of mountain ranges or in river valleys. The American tornado is more destructive than the European, and five or six times as many deaths are ascribed to it.

Other elements, which are especially worthy of research are the direction of motion, speed of motion; length of path, and length of life of the formation. In Europe, more than half of all the tornadoes come from the west or southwest; and only one fourth from directions between north and southeast; they appear in general to travel to the left of the thunderstorm. The mean speed of the tornado is only 23 kilometers per hour, as compared with the 38 kilometers per hour of the thunderstorm. The length of path varies from almost 0 to 400 kilometers, but the most common path is from 1 to 10 kilometers, in length. In general, they last from 12 to 30 minutes. The extremes of duration are 5 seconds and 3 hours 20 minutes.

The width and curvature of path, the relation of the tornado's path to that of hail, the frequency of cyclonic and anticyclonic motions, the amount of pressure fall in the center, and the circumstances surrounding the formation of the whirl, are also pointed out as points upon which much information is needed. Photographic methods are recommended, whenever feasible, on account of the rapid motion and excitement attending the passing of such a formation.—C. L. M.

TORNADES OF OCTOBER 8, 1919.

At 4:04 p. m. of October 8 a tornado struck Hoisington, a town of 2,000 population in Barton County, Kansas, and devastated a strip 400 feet wide through the business and main residence section, either partially or completely wrecking between 50 and 60 houses, and causing a total damage estimated at \$200,000. Twenty five persons were injured, three killed outright, and one died later from injuries incurred.

The storm formed three miles southwest of Hoisington. An eye witness, Mr. John Gruber, who was operating a thrashing rig two and a half miles southwest of Hoisington, stated that clouds from every direction started drifting toward a point half a mile to the southwest of him. The closer they came to this point the faster they moved until within only a few seconds they seemed to be racing with incredible speed. There was no whirling or circular motion until they had come together. After this occurred a terrible roar was heard, similar to that of a heavy freight train, and the whirl seemed to hover over the same spot for several seconds before the funnel shaped cloud lengthened sufficiently to reach the ground, when it headed toward the northeast, striking first the railroad Young Men's Christian

Association Building at Hoisington and the Van Noy Hotel, and then tearing a path directly to the northeast through the town. The force of the storm was apparently spent 5 or 6 miles northeast of Hoisington, though a cancelled check and other papers of Hoisington business houses were picked up the next day at Lincoln, 55 miles to the northeast.

Reports indicate that the funnel-shaped cloud was broader and lower than it usually is in such storms and the violence of the wind does not seem to have been as great as it sometimes is, since a large number of houses

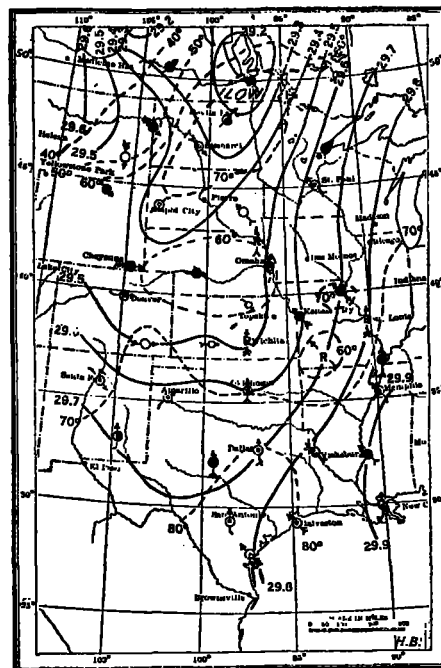


FIG. 1.—Tornadoes of Oct. 8.

directly in the storm path were merely injured by having the roof blown off or a side blown out instead of being completely destroyed.

The storm struck the town without warning, except for the heavy fall of rain and hail that preceded it. A few minutes after it passed the sky cleared and the sun was shining brightly.

Half an hour after the first storm a second tornado formed about 18 miles southwest of Hoisington, near the town of Dundee, and moved toward the northwest for 8 miles, disappearing 2 miles northwest of Great Bend. Several farm houses and buildings were wrecked, live stock were killed, and a fine orchard was ruined, but no one was injured and the total damage was comparatively small.—S. D. F. (from press reports).

NOTE.—Fig. 1, the weather map for 7 p. m., 90th meridian time, shows no temperature conditions at the surface which would indicate tornado weather. There must have been converging winds or a cold over-running wind aloft.—C. F. B.

BALL LIGHTNING AT SALINA, KANS.

At about 6.30 p. m., October 8, 1919, a brilliant display of ball lightning occurred at Salina, Kans., on one of the most frequented street intersections of the town. Eyewitnesses described it as "a ball of fire as large as a washtub floating low in the air." It struck the north-

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